ORIGINAL ARTICLE

# Should parents accompany critically ill children during inter-hospital transport?

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**Background:** Parental accompaniment during inter-hospital transportation (retrieval) of critically ill children is not commonplace in the United Kingdom.
**Methods:** A three month pilot of parental accompaniment was undertaken in 2002 (143 retrievals), after which time the policy was adopted as standard practice. A follow up audit was performed in 2004 (136 retrievals).
**Results:** Findings were remarkably consistent between the two periods. Staff perceived little or no added stress during the majority of transfers (96% in 2002, 98% in 2004), and felt able to perform medical interventions without hindrance (98% in 2002, 100% in 2004). There was good agreement between medical and nursing staff regarding perception of stress and ability to perform interventions (phi statistic 0.57 to 1.00). Adverse events occurred during 11 (3.9%) retrievals; six of these involved a parent exclusively. Stress tended to be associated with adverse events or parental behaviour rather than disease acuity. Staff vetoed the offer of accompaniment on 11 occasions, for a variety of reasons. The majority of parents found the experience safe, beneficial, and perceived a reduction in stress as a result. These data may inform other retrieval services who are considering adopting a similar policy.

The ethos that parents should have unimpeded access to their child when hospitalised is accepted widely, and is endorsed in the Children's National Service Framework.[1] It is debatable however, whether parents should be present throughout every phase of their child's treatment, particularly during episodes that may involve risk.[2–5] Two situations often cited are the induction of anaesthesia,[6 7] or when cardiopulmonary resuscitation is required.[8] A third example, namely inter-hospital transportation of the critically ill child, has become increasingly relevant in the United Kingdom over the last decade. This has come about as a result of centralisation of paediatric intensive care services; with over 4000 episodes estimated to occur annually, the majority via specialised retrieval teams.[9]

It is unusual, however, for a parent to be offered the opportunity to accompany their child during transfer, a view acknowledged by two national documents detailing standards for inter-hospital transport.[10 11] Reluctance to allow parental accompaniment may be for a variety of reasons, including lack of space in the ambulance, the potential for inducing stress in both staff and parents (particularly in an emergency), and even diversion of staff's attention from the patient.[12 13]

The South Thames Retrieval Service is one of the largest paediatric retrieval services in the UK, undertaking approximately 600 retrievals per year.[14] A recent postal survey of 233 parents revealed a high degree of satisfaction with the service; however, a recurrent theme that emerged was the level of parental distress as a consequence of separation from their child during the transfer period.[15] In response, a three month pilot was undertaken in October 2002, whereby a parent or carer was offered the opportunity to travel in the ambulance with their child. Staff and parent experiences were audited over this period, and on the basis of positive findings from the audit, parental accompaniment was adopted as standard practice. A follow-on audit was carried out 18 months later. This report details the findings of the two audits, examining the impact that parental accompaniment has had on the delivery of the service.

## METHODS

A preliminary, anonymised survey of 100 PICU staff was undertaken in April 2002, to gauge attitudes regarding parental accompaniment. Although 72% of respondents supported this concept, one third of this group specified that accompaniment should not be offered unconditionally. Several themes were identified, including: severity of the child's illness, mental state of the parents, a clear explanation of the benefits and risks being given to parents before embarkation, and the ability of the ambulance crew to look after parents if cardiopulmonary resuscitation was needed. Many staff expressed concerns that they would be placed under undue stress, and may be inhibited from carrying out medical procedures.

On the basis of the survey, a three month pilot was undertaken between October and December 2002 (period 1), whereby one parent or guardian was offered the opportunity to travel in the ambulance. Any of the retrieval team members (doctor, nurse, ambulance driver) had right of veto. Parents were given an information sheet about what to expect when travelling in the retrieval ambulance, and retrieval staff discussed aspects of safety with parents prior to departure. Before commencing the pilot, clarification was sought about cover provided by the ambulance service's insurance policy with respect to parental accompaniment.

Data were collected prospectively concerning patient demographics, retrieval team composition, medical and nursing interventions required during the journey (interventions were defined as those over and above routine physiological monitoring), and the occurrence of adverse events. The definition of an adverse event has been published previously.[16] Briefly, an adverse event was defined as any unforeseen occurrence which could actually or potentially affect patient care or the safety of anyone in the ambulance. These included: (a) physiological deteriorations (for example, hypotension, hypoxia); (b) equipment/therapy failures (for example, loss of oxygen supply, mechanical ventilator malfunction); or (c) other (motor vehicle accident, aggressive/abusive behaviour). Nursing and medical staff were

**Table 1** Patient demographics

| | Period 1 | Period 2 | p value |
|---|---|---|---|
| Total number | 143 | 136 | |
| Median patient age (months) | 7.6 (1.4–43) | 18.3 (1.7–60) | 0.14 |
| Median mortality risk (%)* | 10 (5–14) | 5.3 (2.5–11) | 0.02 |
| Number (%) mechanically ventilated | 109 (76%) | 80 (59%) | 0.003 |
| Number (%) requiring inotropic support | 19 (13%) | 19 (14%) | 0.87 |

*Calculated using the Paediatric Index of Mortality score.
Numbers in parentheses represent the interquartile range.

asked independently, via a questionnaire, to rate their stress levels and perceived ability to intervene during the transport. Rating was via a five point Likert scale, ranging from ''stress free'' to ''very stressful'', and from ''intervene easily'' to ''felt inhibited''. Staff were also asked to state whether or not they thought it was beneficial to have a parent accompanying their child.

Parents were given a questionnaire after arriving in the PICU, asking if they had been given the opportunity to travel in the ambulance, and asking about perceived levels of safety and information given during the transfer.

Following the pilot, parental accompaniment was adopted as standard practice, and a follow up audit was undertaken 18 months later, between April and June 2004 (period 2).

Ethical approval was not sought for this audit; however, the audit was registered with our hospital Trust via the standard procedure.

### Statistics

Data are presented as raw counts and percentages, while summary statistics are reported as median (interquartile range). Demographic data are compared using the Mann-Whitney test (continuous) and $\chi^2$ test (categorical). For the staff questionnaire, inter-observer agreement was assessed using the phi statistic ($\Phi$).[17] Phi is more robust than kappa in situations where the majority of outcomes cluster at one extreme (for example, if the majority of retrievals were perceived as stressful). When this occurs, kappa derived agreement over and above chance is small, producing very low kappa values. Phi corrects for this phenomenon, producing a chance independent measure of inter-observer agreement.[18] Like kappa, values for $\Phi$ range from $-1.0$ to $+1.0$, with level of agreement interpreted as follows: less than 0, poor agreement; 0 to 0.2, slight; 0.2 to 0.4 fair; 0.4 to 0.6 moderate; 0.6 to 0.8 substantial; and 0.8 to 1.0, excellent agreement.

## RESULTS

Staff questionnaires were returned for 143/155 (92%) retrievals during period 1 and 136/150 (91%) during period 2, and form the basis of this report. The median (interquartile) journey time from referring hospital to PICU was 40 minutes (25–65). Case mix differed slightly between the epochs; patients in period 2 were slightly older with a lower incidence of mechanical ventilation, and hence disease severity (table 1).

In both periods, the retrieval team typically comprised a doctor, a nurse, and a dedicated ambulance crew. On 32% of occasions, the team included more than one member of the medical staff (typically a fellow and resident), and in 15% there was more than one nurse in attendance (usually for training purposes). The most senior medical staff member present was a consultant (2%), fellow (87%), and resident (11%). The grade of the most senior nurse in attendance was H (1%), G (14%), F (45%), and E (40%). Medical or nursing intervention was required in 39% (109/279) of retrievals (many of these required more than one type of intervention), with the commonest interventions being: administration of sedation and/or neuromuscular blockade (26%), fluid bolus (10%), commencement or adjustment of an inotrope infusion (7%), and endotracheal suction (5%). Adverse events occurred during 11 retrievals (3.9%), and are shown in table 2. Interestingly, the majority of these were not patient related, but rather involved staff or parents, or pertained to a logistic aspect of the retrieval.

Parental accompaniment was offered for the majority (250/279) of transfers, and was accepted in 71% (178/250) of these. The commonest reason for declining accompaniment was the desire for both parents to travel together. The team was unable to offer accompaniment due to a parent not being present at the referring hospital on 18/279 episodes (6.5%), and staff veto occurred on 11/279 occasions (3.9%). Reasons for retrieval team veto were varied, and are shown in table 3. There was no obvious relation between the occurrence of team veto and the seniority of the team members.

The majority of staff found parental accompaniment to be non or minimally stressful (96% period 1, 98% period 2), and found little or no difficulty in performing medical/nursing interventions (98% period 1, 100% period 2). There was generally high agreement between nursing and medical staff

**Table 2** Adverse events occurring during retrieval

| Period | Age (mth) | Mortality risk | Diagnosis | Type |
|---|---|---|---|---|
| 1 | 180 | 54% | Hanging | Cardiopulmonary resuscitation |
| 1 | 1.2 | 52% | Bronchiolitis/HLH | Mechanical ventilator failure |
| 1 | 156 | 14% | Seizures | Unable to fit seatbelt on mother |
| 1 | 11 | 0.9% | Upper airway obstruction | Delay leaving while waiting for mother's bag |
| 1 | 7 | 51% | HLH | Mother travelsick |
| 1 | 0.1 | 37% | TGA | Nurse travelsick |
| 2 | 172 | 4.7% | Status epilepticus | Low battery on infusion pumps |
| 2 | 2 | 9.8% | Anaphylaxis | Mother phobic of blue lights (didn't inform staff) |
| 2 | 166 | 8.9% | Head injury | Monitor failure |
| 2 | 6 | 4.4% | Pneumonia | Mother travelsick |
| 2 | 1.2 | 6.3% | Pneumonia | Mother verbally aggressive as father not able to also accompany |

HLH, hypoplastic left heart syndrome; TGA, transposition of the great arteries.

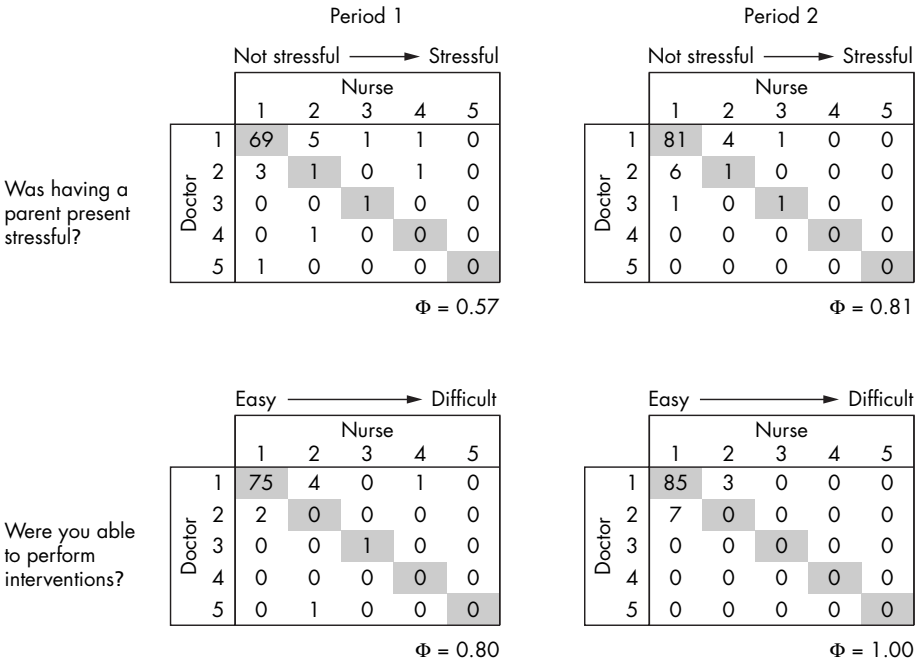


**Figure 1** Agreement between medical and nursing staff according to the perception of stress and the ability to intervene while in the ambulance. Phi (Φ) was calculated by converting the above 5×5 tables to 2×2 tables, with scores of 1–2 indicating the absence of stress/difficulty, and scores of 3–5 indicating presence of stress/difficulty. $\Phi = [(\text{odds ratio agreement})^{0.5} - 1]/[(\text{odds ratio agreement})^{0.5} + 1]$.

regarding their perception of stress levels and ease of intervention, which improved between periods 1 and 2 (fig 1). Interestingly, staff stress tended to be influenced more by parental factors than disease severity or level of staff seniority, with some of the highest stress scores reported during retrievals where a parent related adverse event occurred. On these occasions nurses tended to report higher stress scores than doctors. Interestingly, this was not associated with reported difficulty in performing interventions.

The percentages of staff rating the experience as beneficial/non-beneficial/neither were 79/9/12% (medical) and 88/7/5% (nursing).

Parental questionnaire response rates were identical across the two periods, at 37%. Overall, 98% of respondents classified their personal safety in ambulance as very good or excellent, and 85% classified the information provided during and prior to the ambulance journey as very good or excellent. A recurrent theme that emerged was an overall reduction in parental stress as a consequence of accompanying their child; this included one parent who was present while her child required cardiopulmonary resuscitation in the ambulance.

## DISCUSSION

The results of this audit show that parental accompaniment during paediatric retrieval is feasible, appears beneficial for parents, and generally provides little in the way of stress or hindrance to staff.

It is interesting to note that many of the potential difficulties predicted in our initial staff survey were not realised. One third of PICU staff respondents in the pre-pilot survey who were in favour of parental accompaniment stipulated that a series of conditions should be fulfilled before it is offered. However in practice, staff veto was only taken on 3.9% of occasions, and adverse incidents involving parents reported in 6/178 (3.4%) of accompanied transfers. A similar discrepancy between perceived and actual difficulty has been shown in a large United States survey of 110 retrieval teams.[13] Thirty six per cent of teams who do not allow parental accompaniment predict potential problems with this practice; however, difficulties are reported by only 8% of teams who allow accompaniment.[13] It has also been shown that parental presence in the accident and emergency setting does not adversely affect clinical performance or increase anxiety among the attending staff.[19]

**Table 3** Reasons for staff vetoing offer of parental accompaniment

| Period | Age (mth) | Risk | Diagnosis | Veto | Reason |
|---|---|---|---|---|---|
| 1 | 68 | 4% | Status epilepticus | Whole team | Lack of space |
| 1 | 6 | 12% | Bronchiolitis | Whole team | Parent required medical attention |
| 1 | 144 | 4.9% | Multi-trauma | Doctor | Parent's behaviour perceived as inappropriate |
| 1 | 120 | 30% | ARDS | Doctor | Patient too unstable |
| 1 | 31 | 0.9% | Thoracic aortic tear | Ambulance crew | Unknown |
| 2 | 19 | 3.5% | Asthma | Doctor and nurse | No English spoken, no translator, taxi ordered by DGH |
| 2 | 187 | 26.5% | Severe arrhythmia | Doctor and nurse | Patient too unstable |
| 2 | 39 | 18.7% | Sepsis | Whole team | Lack of space |
| 2 | 24 | 89% | Meningitis | Doctor and nurse | Parent required medical attention |
| 2 | 0.1 | 2.7% | Tricuspid atresia | Doctor and nurse | Mother given birth <6 h, and required medical attention |
| 2 | 0.1 | 2.9% | Obstructive uropathy | Doctor | Mother given birth <6 h, and required medical attention |

ARDS, acute respiratory distress syndrome; DGH, district general hospital.

## What is already known on this topic

- Parental accompaniment during inter-hospital road transportation of critically ill children is uncommon in the UK
- Experience from the United States suggests that this may place extra stress on staff

## What this study adds

- Parental accompaniment per se does not appear to increase staff stress nor compromise the performance of medical interventions in the majority of occasions. When present, staff stress tends to be associated with parental behaviour and the occurrence of adverse events rather than the child's disease acuity
- Although adverse events were rare, a significant proportion involved a parent directly

Although rare, parent related adverse events during the retrieval did have an impact on our staff, producing a degree of stress that was higher among nurses. Adverse events causing greatest stress were those that involved a parent becoming unwell, or exhibiting aggressive behaviour. Although staff did not perceive difficulty in performing interventions on these occasions, we are unable to assess whether stress compromised performance in other ways (such as decision making and technical competence); thus this factor must be born in mind by other retrieval services that are considering parental accompaniment. Conversely, many staff members reported that having a parent present produced a calming effect on non-ventilated patients, similar to the United States experience.[13] Other benefits reported by staff included opportunities to develop a rapport with the parent, explain aspects of the child's illness, clarify what to expect while in the intensive care unit, and to take a full medical history.

These themes were mirrored by the parents' survey, where the perception of benefit was an unambiguous and recurrent qualitative finding. It was remarkable how similar many of the comments were to those reported from an audit in the United States.[20] The latter report highlighted that parental requests for accompaniment were more likely for children who were older, non-ventilated, and for those who have been previously well (as opposed to suffering from chronic illness); conversely disease acuity did not appear to influence the desire to travel in the ambulance.[20] We also found that parents who did not accompany often reported additional stress associated with negotiating transport to the referral centre.

A service development may initially be followed by a honeymoon phase, after which time enthusiasm for the development wanes, or deficiencies become apparent. Thus we were reassured to see consistency in results, both for staff and parents, across the two audit periods spanning 20 months. As a result, we have continued to provide the service in its current format, including preservation of the right of staff veto. It is hoped that our results may inform other services that are considering adopting a similar policy.

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